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ABSTRACT

This paper addresses the role of the school principal in school improvement through secondary analysis of data collected from 98 elementary schools in Tennessee that participated in the School Improvement Incentives Project between 1983 and 1986. The paper explores an instructional leadership model as operationalized in measures of selected school context variables, principal gender, principal instructional leadership, school level instructional climate, school level instructional organization, and reading achievement. The paper examines the instructional leadership model developed by researchers at the Far West Laboratory (FWL) for Educational Research and Development with particular attention to the relationships among endogenous variables included in the conceptualization. The paper's analysis generally supports the FWL model. Results indicate that principals' instructional leadership appears to be exercised primarily through behaviors that shape school level instructional climate. The model suggests that principals can influence student learning by developing a clear mission that provides an instructional focus for teachers through the school. Appended are two instructional leadership models and estimated equations and matrixes. (SI)

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What Makes a Difference? School Context, Principal Leadership, and Student Achievement

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For many years theorists have accepted the premise that organizational leadership can be understood through contingency models. Features of the organization and its environment are believed to influence the managerial behavior of leaders in both schools and other organizations. Unfortunately, the implicit models that tend to guide educational policymakers generally overstate the influence of school administrators on organizational processes and outcomes, while underestimating the impact of environmental and organizational constraints on their leadership behavior (March 1978). This model of "the educational leader as the independent variable" in school organization and improvement efforts also characterizes much of the research and professional literature on school leadership (Bridges, 1977; Rowan, Dwyer & Bossert, 1982; Murphy, Hallinger & Mitman, 1983).

Most of the literature on the relationship between administrative leadership and student learning consists of either case study reports or overly simplified, bivariate statistical models (Bridges, 1982). Constraints on the resources of doctoral students and other researchers investigating this domain of schooling have led to studies that are long on caveats and limited in their ability to contribute to the accumulation of knowledge. Small sample sizes, inadequate research designs, and atheoretical models abound. While some notable exceptions to this statement exist (e.g., Andrews & Soder, 1986; Eberts & Stone, 1988; Miskel & Owens, 1983; Rowan & Denk, 1983), there have been surprisingly few systematic empirical investigations of school leadership using multiple factor, causal models (Bridges, 1982). This remains true during the 1980's, despite increased attention in the educational community on the role of the school principal in school improvement.

This paper makes a modest attempt to address some of these weaknesses cited above through secondary analysis of data collected from 98 elementary schools in Tennessee that participated in the School Improvement Incentives Project between 1983 and 1986. The paper explores an instructional leadership model as operationalized in measures of selected school context variables, principal gender, principal instructional leadership, school level instructional climate, school level instructional organization and reading achievement. The paper does not focus on the question of whether or not principal instructional leadership has an impact on school outcomes. Rather, the purpose of the paper is to examine the adequacy of the instructional leadership model developed by researchers at the Far West Lab, with particular attention to the relationships among endogenous variables included in the conceptualization.

Conceptual Framework

Seminal work conducted by the Instructional Management Program at the Far West Lab during the early 1980's laid important groundwork for reconceptualizing the principal instructional leadership role of the principal (Bossert, Rowan, Dwyer & Lee, 1982). The Far West Lab (FWL) model of principal instructional leadership incorporated knowledge from studies of schooling, leadership and organizations. The result was a framework in which principal instructional leadership and its effects are located in the context of the school organization and its environment. Although this model stimulated much discussion about instructional leadership, as we noted above, this is not reflected in the empirical work conducted in this field since 1983.

The FWL framework places principal leadership within both organizational and environmental contexts. Exogenous variables influence the exercise of principal leadership. (See Figure I.) The principal, in turn, shapes the school's instructional climate and instructional organization, thereby affecting student learning. Thus, this framework conceptualizes principal leadership as affecting student outcomes indirectly.

[Insert Figure 1 about here]

Two sets of environmental variables are thought to influence the principal's instructional leadership behavior: the community and institutional contexts. Features of the community such as homogeneity, socioeconomic status, parent expectations and involvement, and geographic location (i.e., urban, rural, suburban) are viewed in this model as placing varying constraints on the principal and as providing different types of opportunities for leadership. In this paper, two measures of community context are included in the analysis: school level SES and parent involvement. Similarly, principals function in different institutional contexts. School and district size and complexity, the number and types of special programs, faculty experience and stability, school level, district support and expectations and other factors shape principal approaches to instructional leadership. No measures of the principal's institutional context are included in the analyses presented in this paper.

Though not an environmental variable per se, an additional exogenous variable included in this model is represented by the beliefs and experiences that the principal brings to the job. Studies of varying quality suggest that prior teaching experience, gender, and the principal's expectations for self and others may influence the manner in which the principal exercises leadership. In this paper, gender and prior teaching experience were included as measures of personal beliefs and experiences.

In the FWL framework, the three exogenous variables are posited to have direct effects on principal instructional leadership. Research conducted by Bossert and his colleagues (Dwyer, Lee, Rowan, & Bossert, 1983) found that principals exercised instructional leadership primarily through routine behavior that shaped the instructional climate and organization of the school, rather than through intensive, direct, ongoing intervention in the instructional process. The measure of instructional leadership utilized in this study focused attention on representative behaviors and practices such as those identified by Bossert and his colleagues in reports of their research (Dwyer et al., 1983).

Instructional climate refers to those facets of the school which shape the attitudes and behaviors of staff and students towards instruction and learning. In this study, instructional climate was conceptualized as three related, but separately measured, constructs: school mission, student opportunity to learn, teacher expectations for student learning.

Instructional organization refers to the manner in which the school organizes opportunities for teaching and learning. Practices such as grouping for instruction, tracking, and features of the curriculum comprise the instructional organization of the school. For this study of elementary schools an admittedly limited measure of instructional organization was utilized: the degree to which students were grouped homogeneously by prior achievement level by class at given grade levels.

Student outcomes in the FWL model may be thought of quite broadly. This study utilized measures of reading and mathematics achievement. In this paper, only reading achievement scores are reported. It should be noted at this point that the FWL model is linear in terms of the nature of relationships among variables. Context variables influence principal leadership, which shapes school level climate and organization, which influence student learning. Although Bossert and his colleagues presented the initial conceptualization as a linear model, later work suggests that interactions among model components are to be expected. The analyses presented here tested the linear model and a more sophisticated adaptation of the FWL instructional leadership framework.

Research Design

This paper represents a secondary analysis of data collected from a total of 98 elementary schools in Tennessee which participated in the state's School Incentives Improvement Program (SIIP). SIIP was a four year study (1983-86) designed to assess the impact of school-level, financial incentives on student achievement. While the project successfully implemented a true experimental design during its third year, the current study is not concerned with the manipulated variable. It uses a structural modeling technique to test the fit of Bossert's model in the SIIP project schools. Data are drawn from the first through the third years of the project (Spring, 1983 through Summer 1985).

Recruitment of Subjects

Schools were recruited for voluntary participation in the program during the spring and summer of 1982. In the spring of 1982, the Commissioner of Education held meetings across the state with superintendents of all Tennessee school systems in which he explained the purpose of the project. Afterwards, a letter went from the Commissioner to all superintendents outlining guidelines for participation in the project. Of the 36 of the 147 school superintendents in the state returned participation request forms. These 36 systems represented a potential pool of 270 elementary schools. Calls and visits were made by SIIP staff to all superintendents who had responded positively to the initial inquiry from the Commissioner. Following these contacts, 28 superintendents representing 133 schools indicated a continued interest in participation.

Criteria for participation in the project included: location, size, and type of school system. Given the statewide nature of the project it was important to include, to the greatest extent possible, systems that represented Tennessee schools as a whole. Grade structure and testing patterns were also of primary importance. Schools with the most extensive testing programs, which also included grades 1-6 or 1-8, were identified as first choice participants. Because they did not include schools that had the 1-6 or 1-8 grade configuration, five of the remaining twenty-eight systems were dropped from consideration. A total of 110 schools in the 23 systems that remained met general project criteria. Of these, 98 ultimately agreed to participate in the project. However, eleven schools withdrew from project participation before the project's third year. Thus 87 schools remained in the SIIP project throughout the period of this study.

Data collection and Variables Studied

The achievement measure used here is a criterion reference, reading test designed by the State Department of Education. Schools administered these tests to third and sixth grade students in both the fall and spring of academic 1984-85. The fall administration was used as a pretest while spring scores served as a post-test. Before analyses began, gains over that school year were computed as post-test minus pre-test. These gain scores were then regressed on pretest level. The residuals of this regression served as the final achievement gain variable (RREAD).

In the winter of 1984, school administrators at all 87 schools completed a School Information Form. This instrument collected contextual and demographic information on each school. It included several SES measures. The measure used here is the percentage of students regularly receiving free or reduced price lunches (PERCFL).

In the first and third years of the project, principals and teachers completed questionnaires. Specific areas of inquiry included in the questionnaires were: (1) an assessment of factors associated with effective schools and the degree to which these might change during participation, (2) organizational variables hypothesized to be related to student performance, (3) faculty attitudes toward their own ability to improve student performance, (4) the valence of various incentives to school personnel, and (5) the relationship of certain contextual variables to faculty effectiveness. The Connecticut School Effectiveness Questionnaire (CSEQ) (Villanova, Gauthier, Proctor, & Shoemaker, 1981) served as the source for 72 of the approximately 275 items on the questionnaires. Each year over 1,300 teachers (>90%) completed questionnaires while no more than three principals failed validly to complete and return their questionnaires.

The present inquiry employs several measures from the teacher questionnaires. Four of these are derived from the CSEQ items: principal instructional leadership (PLEAD, 18 items), clear school mission (MISS, 10 items), opportunity to learn - time on task (OPPO, 10 items), and parental involvement (INVOL, 4 items). In addition a measure of teachers' expectations for the academic achievement of their students (EXPT, 4 items), and a single item measure of grouping practices in reading (RGRP) came from the teacher questionnaires. The expectations scale was drawn from the School Structure and Climate Study (Miskel, Bloom, & McDonald, 1982) while the RGRP item was developed by SIIP staff. RGRP is a dichotomous item -- 0= did not group within grade by achievement level, 1= did use such grouping. Before analyses began, all variables were aggregated to the school level by taking the mean of all items for

each teacher on each scale and then taking the mean across teachers.

Note that in the case of grouping, RGRP, this aggregation procedure resulted in a measure defined as "the percentage of teachers in a school who report their school as using the grouping practice." This measure obviously contains a good measure of noise, all of which may not be white noise. In particular it is confounded by school size; grouping may be more difficult in smaller schools. In addition, the measure may well reflect agreement about practice as much as actual practice.

Principals' sex (PSEX -- 1=female, 2=male) and years of teaching experience (TEXP) were drawn from the principal questionnaire. To facilitate estimation of the structural model, TEXP was defined as total years of teaching experience divided by seven. This transformation was necessary to produce a set of variables with near equal variances. Before the transformation, TEXP's variance was so much greater than that of other variables in the study that it threatened the accuracy of the estimation routine.

Data Analysis

The operationalized FWL model was tested using a structural modeling program, EQS, running on an IBM compatible micro-computer. Since the model is recursive, identification was assured. Estimation proceeded in two steps. In the first step of the analysis, the model presented in Figure 1 was estimated. This model posits a causal process that is severely constrained and linear. That is, the model presents variables as neat, direct links in a linear causal chain -- each variable affects only the next link in the chain. Such simplified structures are appropriate for rational theory building, but seldom fit empirical data. In fact, Bossert and his colleagues acknowledge that the theoretical relationships among the variables in their framework are probably interactive, rather than linear. Empirically, causal chains usually include a number of indirect links. The data in the present study did not support the simple causal structure of Figure 1. The chi-squared test for fit produced a value of 64.4, df=19 ($p<.001$) and the normed Bentler-Bonett fit index was 0.563.

In the second step of the analysis, a more complex structure was estimated (again a recursive model). This structure differed from the original model in three respects: 1) Direct links were added between the antecedent variables preceding principal leadership (PLEAD) and those that follow PLEAD; 2) Variables within the instructional environment construct were organized into a causal structure; 3) Teaching experience (TEXP) was excluded from the analysis. These structural changes were suggested by the residual covariance matrix and could be justified as a theoretically defensible model. Teaching experience (TEXP) was dropped because it did not correlate with principal leadership (PLEAD) or any variable affected by PLEAD: that is, the teaching experience variable, TEXP, did not contribute to the model.

These structrual changes neither affected the originally hypothesized role of principal instructional leadership nor changed the relative position of each set of variables in the model. They did, however, result in a rationally defensible model that fit the data, chi-squared = 27.5, df=19 ($p>.05$) and Bentler-Bonett fit index = 0.911. However, as with any post hoc analysis, the results should be interpreted with caution. The model that emerged from step two is presented in Figure 2.

[Insert Figure 2 About Here]

Discussion

The results of this analysis generally support the FWL model. Principal instructional leadership appears to be exercised primarily through behaviors which shape school level instructional climate. Effects of principal leadership on student learning are, as predicted by the model, primarily indirect. The final model suggests that principals can influence student learning by developing a clear mission that provides an instructional focus for teachers throughout the school. This creates a school environment that focuses on and facilitates student learning. The model also points to the important role played by

teacher expectations as a school climate variable. Again, the principal appears to have a key role, beyond that of parents, in creating a climate of high expectations in the school.

Exogenous variables also appear relevant to understanding the leadership behavior of the principal. The effects of principal's gender (PSEX), percent free lunch (PERCFL), and parental involvement (INVOL) on principal leadership (PLEAD) were estimated to be significantly greater than zero. This supports the contention that principal leadership must be viewed as both an independent and dependent variable. The context of the school and certain personal characteristics of principals shape the leadership style and behavior of the principal. This is consistent with other research that suggests important differences in the leadership style and behavior of male and female principals (Glassman, 1987; Gross & Trask, 1976; Hallinger, 1983) and of principals who work in different school socioeconomic contexts (Hallinger & Murphy, 1985). Additional analyses that focus on the manner in which context and gender influenced principal leadership in this sample will be conducted in the future.

Perhaps the most interesting finding in this study concerned the modeling of principal leadership and school level instructional processes. Ultimately, it is probably less significant to know the degree of direct effect the principal has on student learning than the ways in which principals shape important facets of the school's educational program that influences students. Principal instructional leadership had a significantly positive effect on clear school mission. This and the other instructional environment variables did have a positive affect on residualized reading gains.

There were also some departures from the model. The results clearly indicate that principal leadership had a minimal effect on grade level grouping practices. This may be due to limitations cited earlier with respect to the measurement of instructional grouping. Additional analyses are necessary to examine this relationship. Not predicted by the original model, but supported by these data, are the findings that school level SES and parent involvement had direct effects on teachers' expectations for their student's academic success. This finding is certainly consistent with earlier research on school effects and suggests a need for adaptation of the theoretical model. In addition, the data indicate that clear school mission, student opportunity to learn, and teacher expectations are separate variables with causal structures of their own.

In conclusion, this study suggests that the FWL instructional management framework of principal leadership is supported by empirical data. Departures from the model suggested post hoc by the data point towards generally sensible directions for further model development. Specifically, a more accurate model would include interaction among variables, rather than by an exclusively linear modeling of relationships between principal leadership and other school level processes. Future analyses of this data set will explore other models to determine the efficacy of competing conceptualizations of the school context, principal leadership and student learning.

Figure 1
Far West Lab Instructional Leadership Model

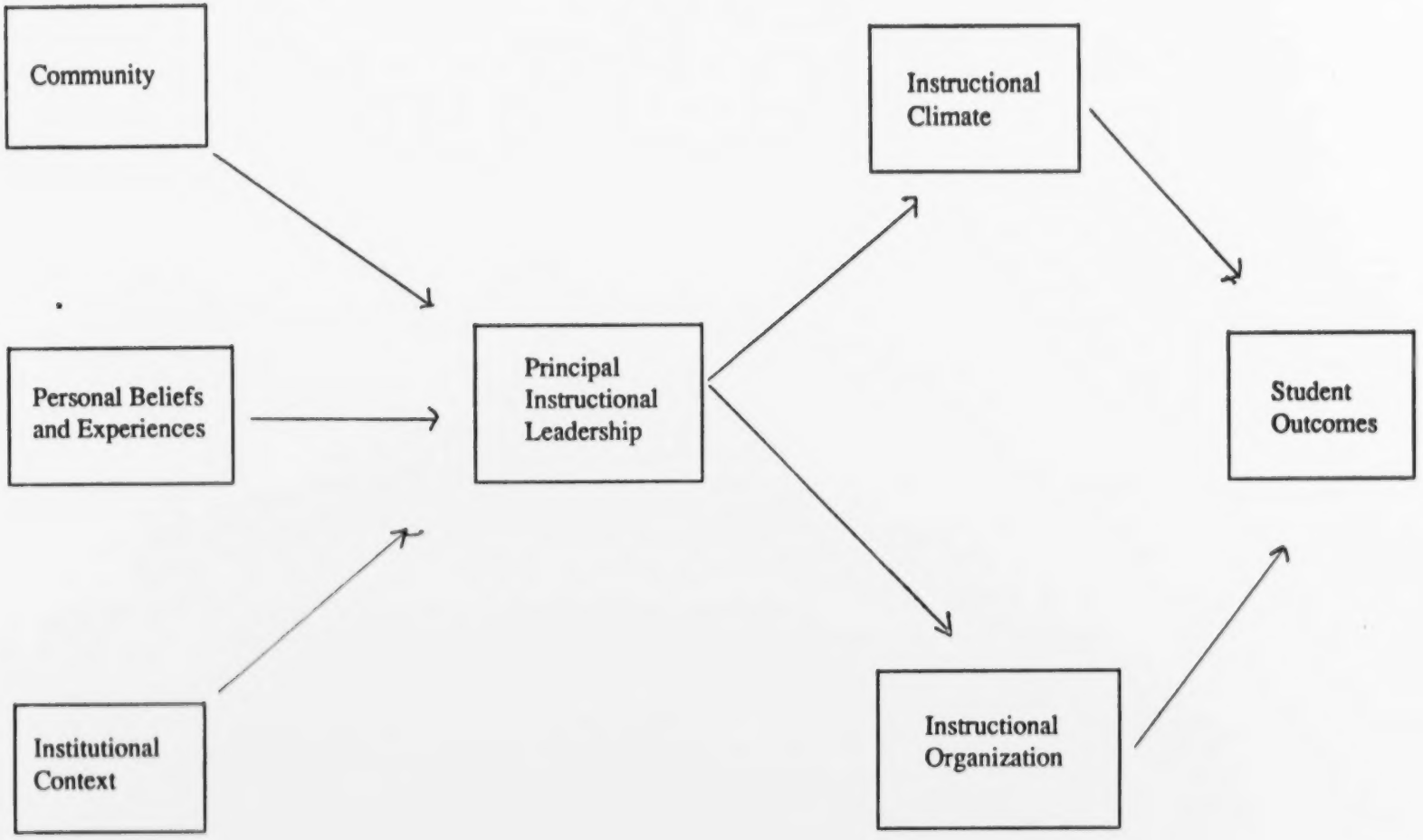
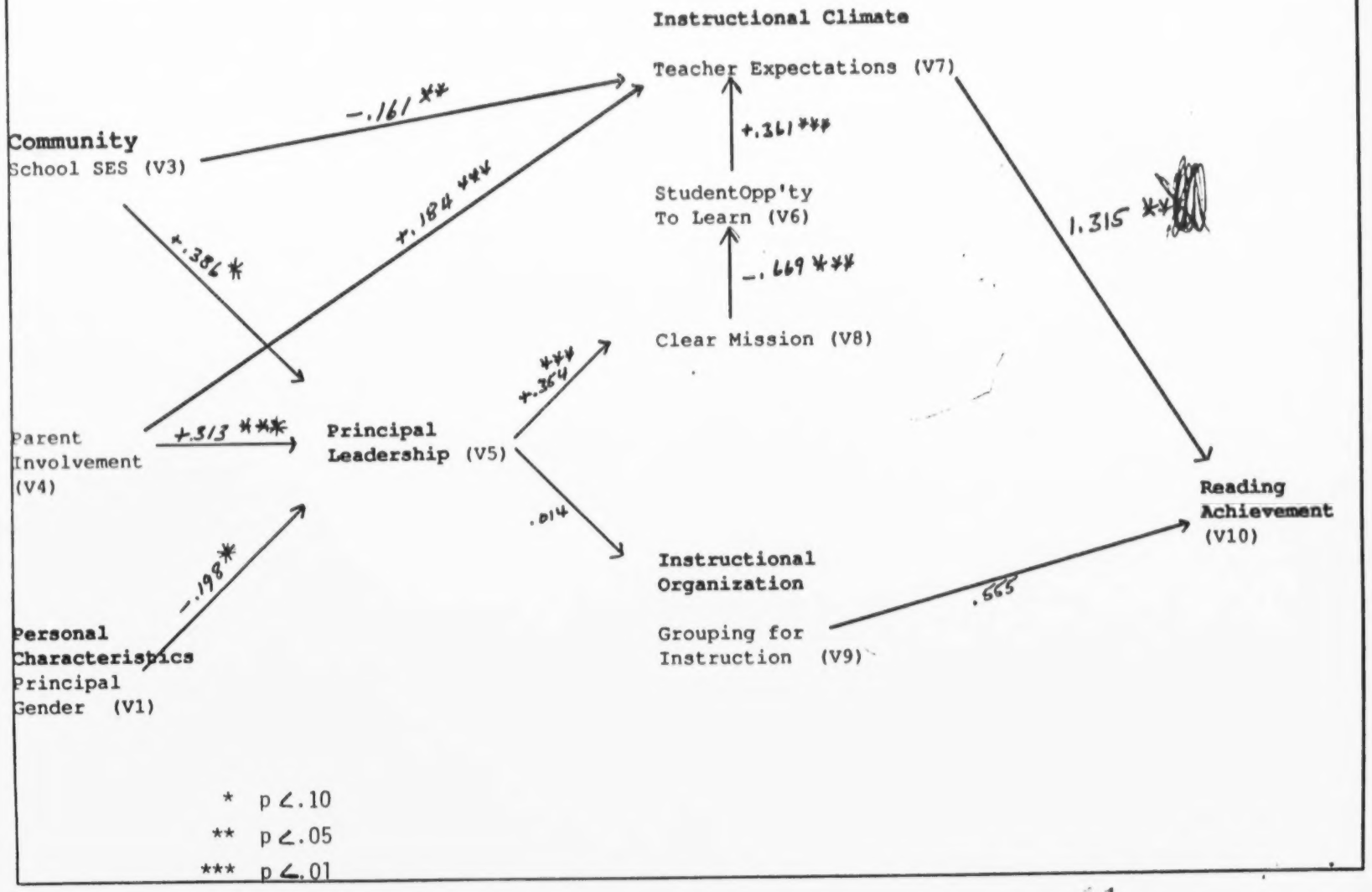


Figure 2
Final Model of Principal Instructional Leadership and Student Achievement



* p < .10
** p < .05
*** p < .01

Figure 3
Estimated Equations

PLEAD (V5) = - 0.198*V1+ 0.386*V3+ 0.313*V4+ 1.000 E5
0.108 0.219 0.100
- 1.840 + 1.766 + 3.140

OPPO (V6) = 0.669*V8 + 1.000 E6
0.079
8.501

EXPC (V7) = 0.361*V6 - 0.161*V3+ 0.184*V4+ 1.000 E7
0.066 0.080 0.036
5.467 - 2.023 + 5.090

MISS (V8) = 0.354*V5 + 1.000 E8
0.064
5.531

RGRP (V9) = 0.014*V5 + 1.000 E9
0.060
0.236

RREAD (V10) = 1.315*V7+ 0.555*V9 + 1.000 E10
0.535 0.541
2.456 + 1.025

Figure 4
VAR-COV MATRIX ANALYZED

		PSEX	PERCFL	INVOL	PLEAD	OPP	EXPC	MISS	RGR2	RRES
		V1	V3	V4	V5	V6	V7	V8	V9	V10
SEX	V1	0.185								
PERCFL	V3	0.010	0.059							
INVOL	V4	-0.047	-0.068	0.291						
LEAD	V5	-0.047	-0.001	0.074	0.176					
OPPO	V6	-0.004	-0.012	0.045	0.057	0.064				
EXPC	V7	-0.015	-0.026	0.081	0.044	0.033	0.050			
MISS	V8	-0.015	-0.011	0.051	0.062	0.049	0.033	0.073		
RGR2	V9	0.007	-0.001	0.007	0.002	0.005	0.009	0.008	0.044	
RRES	V10	-0.053	-0.031	0.051	0.110	0.044	0.071	0.025	0.036	1.020